

The NICHD Connection

November 2017

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Dr. Tamás Balla, Investigator Mentor of the Year, on Thinking Outside the Box

Thinking outside the box is a metaphor that means to think differently, unconventionally, or from a new perspective, as defined in Wikipedia. There are several great quotes from famous scientists relevant to this. Three of my favorites are:

“Research is to see what everybody else has seen, and to think what nobody else has thought” (Albert Szent-Gyorgyi)

"We cannot solve our problems with the same thinking we used when we created them." (Albert Einstein)

"The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them." (Sir William H. Bragg)



Dr. Tamás Balla, NICHD Investigator Mentor of the Year

When thinking about this question [Editor's Note: we prompted Dr. Balla with *What does "thinking outside the box" mean to you in relation to research, career development, and mentoring?*], most people feel that something special is required such as great talent and creativity. My experience is that while those traits are certainly very important (and probably separate the real geniuses from the rest of us), it is an issue that comes up every day and determines how we all approach science.

So, why is it so difficult to think outside the box, when we all recognize its importance and have a desire to do it? I think the reason is that our brain needs solid points of reference when organizing new information and forming new ideas. These solid points are based on the existing scientific literature and the generally accepted views that are built upon them. It is extremely difficult for us to deviate from these "axioms" because when we try to discount them, we have very little to lean on. Moreover, how do we know which dogmas are to be challenged? We might throw out the ones that are correct and should be kept.

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Letter from the Editor

When was the last time you were stuck on a research problem? Did you work your way out by trying the same approach over and over again? Probably not. And if you did, I'm guessing you're still stuck on your research problem.

We all need to take a step back sometimes, to look at our work from a fresh angle. Your best resource for solving a particularly pesky problem might be the new postbac sitting at the desk next to you. Most early-career recruits have an uncanny ability to "think outside the box," maybe because the NIH attracts the brightest of the bunch (in my opinion), but most likely because they're not boxed in by current dogma.

This issue begins our three part series on "thinking outside the box." We'll explore this topic from the postbac to PI perspective, and all levels in between. I can't think of a better way to start than with [reflections from our Investigator Mentor of the Year, Dr. Tamás Balla](#). His words steer to the core of what it means to be a scientist, and how remaining open to all possibilities is something that defines the profession.

To get to a point where you are questioning dogma, you have to know what the dogma is. [Postbac Leana Ramos offers her thoughts](#), based on her own experiences and discussions with others, about strategies that have helped her decipher "what's *in* the box." Her article is especially relevant for fellows who are mentoring early career trainees, as it's easy to forget what it's like to be new to research.

On a final note, I want to draw your attention to an upcoming opportunity organized by the NICHD Office of Education. For the first time, NICHD fellows will have access to [The Business of Science](#), a certificate program led by the SciPhD group, designed for fellows and graduate students who are interested in a career in industry. Check out the [November announcements](#) for more information!

Your Editor in Chief,
Shana R. Spindler, PhD

Please send questions and comments to our editor at Shana.Spindler@gmail.com.

Dr. Tamás Balla, Investigator Mentor of the Year, on Thinking Outside the Box

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For most scientists, it is hard to float experimental findings in their brains without organizing them into some logical pattern. However, while our findings might be correct, the “logical” conclusions drawn from them may be wrong, and if so, building on them will take us in the wrong direction.

I always encourage my colleagues to read papers by focusing on the data and seeing what conclusions they would make before even looking at the authors’ conclusions. Unfortunately, many papers are written in such a way that the reader is led through complicated results following the authors’ logic. In other words, the reader is led into the “box” that the authors have created. It takes an effort to digest a paper without this “help” and to simply stay with the data and reach our own conclusions.

So, thinking outside the box requires us to give up something that we think we already possess (a certain amount of widely accepted knowledge) without knowing whether this will help us gain something more valuable or whether we will be rewarded for it. This feels like walking away from our stated goals in order to reach them. I often liken this to a large crossword puzzle that someone has started to solve, and we have to take over to complete it. Some words could be wrong, but we are not sure which ones (if any). Yet, if we stick to the already written ones, we may never be able to solve the whole puzzle because we would need to correct the incorrect ones. We have to constantly scrutinize and be ready to change what is already written in order to have a chance to complete the whole puzzle. And here comes the responsibility of scientists regarding generating reliable data. The data should always be solid even if the conclusions drawn from them have to change as science advances.

Unfortunately, the quest of publishing in top journals often favors the kind of science where one wants to prove the hypothesis and is satisfied with the minimal results that support it. When one experiment “does not work” then it is either put aside or is repeated until the “right results” are obtained that fit with the hypothesis. This may be a good recipe to generate great stories that look like great science, but increasingly it is a frustrating trend that often contaminates the scientific literature. With such practices, our metaphorical crossword puzzle will have more and more incorrect words, and it will be increasingly difficult to solve the grand puzzle since these publications receive even larger weights than others that are published in lesser journals.

In my view, the right way to do science is to repeatedly challenge our hypothesis with the intent to disprove it rather than prove it. If the hypothesis stands several

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Dr. Tamás Balla, Investigator Mentor of the Year, on Thinking Outside the Box

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rounds of scrutiny and it still stands, it might be correct. When unexpected results show up, we should welcome them instead of mourning the loss of our hypothesis. In fact, the unexplainable results present us with the opportunity to dare ask whether the existing dogmas are as certain as we believe they are, or even if the initial assumptions have to be reevaluated. This is the chance to step outside the box.

How does mentoring come into this picture? Julie Axelrod once said that if you want to enter a new field of science, the best thing you could do is not read the existing literature. Of course, as clever as it sounds, this wisdom is only half-true. If you do not know the literature, you will find yourself repeating many experiments that have been done before. The challenge remains being aware of the literature, while not being “boxed in” by it. In my opinion, it is the job of the mentor to know the literature and the existing scientific views while leveraging the student’s unbiased eye to challenge every conclusion.

A good mentor tries not to make the student think the same way as he/she does. The student should be the fresh eye that will help the mentor climb out of the box. This is why mentoring and working with younger colleagues is so essential to the progress of science.

Some people can think outside the box on their own, but most of us need help to do so. In the lab, we often play the mental exercise asking: what would be the logical experiment based on the knowledge that is available for all scientists that work in our fields. That is the experiment we should not do. First, because most likely someone else is already doing it, but more importantly, because that may not necessarily give us a new insight. We want to look at the problem from an angle that others may not think about. Difficult, indeed. I am not sure I will ever get myself outside the box. But we sure keep trying, and together with the help of my fellows and students, we still might have a shot.

Thoughts of a Postbac: Learning What's in the Box

By Leana M. Ramos

In science, to “think outside the box” requires decoding what’s *inside* the box. I like to think of scientists as explorers who study things that are unknown. Under the guidance and support of mentors, young scientists, such as myself, develop skills and independence to solve problems. Research can be challenging at any stage of a person’s career, but it can be especially challenging for someone who has just started in a lab. So how do we peer into a box of unknowns so that we can begin to think outside of it?

After reflecting on advice from my mentors, postdocs, graduate students, fellow postbacs, and my own NIH experiences during these past few months, I think that I can offer a few insights and share my colleagues’ guidance.

LEARN THE LITERATURE, INSIDE AND OUT

A key step in figuring out “what’s inside the box” is to read and deeply understand scientific papers. The process is easier said than done, but I’ve realized that you get better at reading papers by reading papers.

Although everyone learns differently, three steps are helping me improve my skill of reading and understanding the literature. First, I read a publication for fun. I form vivid images in my mind, like a movie, and I imagine molecules of different shapes and sizes interacting with each other as if they are in a dance. Second, I draw on separate sheets of paper what I visualize in my mind. I think that using another sense, like the sense of touch, helps organize and integrate ideas presented in the paper. Third, I write my thoughts and a summary of the paper, which helps me cohere the material.

An important part of reading a paper is to critically evaluate the data. Bridget Donnelly, a graduate student in the NIH Graduate Partnership Program, offers strategies on how to interpret data when reading a paper. She encourages one to examine the figures first, to interpret what the data means without the author’s bias in mind. She emphasizes that practice at data interpretation helps in the long run. If she’s unfamiliar with a particular method or technique, she turns to the Internet to learn more.

Journal clubs offer an opportunity to learn about studies outside your own field and critically evaluate papers with experienced scientists. Dr. Medha Raina, a postdoctoral fellow at the NICHD, emphasizes the importance of attending journal clubs and diverse

Thoughts of a

Postbac

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Thoughts of a Postbac: Learning What's in the Box

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seminars, such as the Wednesday Afternoon Lecture Series (WALS). She says, "Many times experiments fail, so you have to constantly think in different directions...Participation in journal clubs forces you to analyze experiments from other fields and may help you incorporate ideas into your own research."

TALK TO OTHER SCIENTISTS

Even when you are working hard in the lab and immersing yourself in scientific literature, you can still get stuck on a research problem, back inside *the box*. "It can be really difficult to look at the problem from a new angle," says Donnelly, "so when I'm stuck, I like to talk to someone who is unfamiliar with my project...they may ask a question that I hadn't thought about, or ask for clarification that sparks an idea for me."

When Donnelly chats with non-scientists, she enjoys thinking about her project in general terms and why people should care about it. Thinking about her research from a less technical point of view helps Donnelly form a big picture as she works through research challenges. She admits, "It's easy to get caught in the details!"

TAKE CARE OF YOURSELF AND HAVE FUN!

It is important to relax and have fun while interacting with others. The importance of self-care, which is defined as any "activity that we do deliberately in order to take care of our mental, emotional, and physical health,"¹ to fostering one's inventiveness cannot be overstated.

Research shows that physical activity, such as walking, "opens up the free flow of ideas, and it is a simple and robust solution to the goals of increasing creativity."² Sleep, although sometimes neglected, is another activity that everyone needs to promote optimal health and well-being. According to a sleep-related anecdote about the German chemist August Kekulé, he had a dream of a snake biting its own tail, which inspired him to propose a ring structure for benzene.³

Although research is challenging—experiments may fail or we may feel pressure in the lab to succeed—we shouldn't forget about the idea that we are venturing into the unknown. We may never know entirely what's "in the box," but eventually we can use creativity, imagination, and "thinking outside the box" to answer scientific questions and solve real world problems.

REFERENCES

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3. History of Chemistry: Kekulé (2002). <http://www.brooklyn.cuny.edu/bc/ahp/FonF/Kekule.html> (accessed 20 October 2017).

The Rep Report

By Suna Gulay, PhD



As the current NICHD Basic Sciences Representative, I represent NICHD postdoctoral fellows at the FelCom meeting every month and share the latest news with you here. Do you have a concern or question that you want brought up at the next meeting? Contact me at suna.gulay@nih.gov!

We began the new fiscal year with two elections: Dr. Carlos Guardia of NICHD (Bonifacio Lab) and Dr. Ying Fu of NCI ran uncontested to become FARE Subcommittee co-chairs, while Dr. Choon Kiat Sim of NHGRI won the majority vote to become the Child Care Board Liaison (basic science). Congratulations!

We have more elections coming up soon, so apply today! Mention why you are interested in the position and any relevant experience in your email.

1. **Recreation and Welfare Committee Liaison** (contact: stal.shrestha@nih.gov)
2. **Social Committee Co-Chair** (contact: luiz.barella@nih.gov and stal.shrestha@nih.gov)
3. **Training Directors Committee Liaison** (contact: valerie.miller@nih.gov and belinda.hauser@nih.gov)
4. **FelCom Basic Science Co-Chair** (in December) (contact: sarah.morgan2@nih.gov)

Additional opportunities are available in the Visiting Fellows Committee (VFC) as advertised in their October meeting agenda:

1. "Two new positions will be available soon in the VFC Social team. The mission will be to help organizing the current social events organized by VFC, in collaboration with Dario Marangoni and Subhasis Ray. It will include communications to the VFC list, prospection and negotiations with providers and participation to the monthly VFC meetings." (contact: marangonid@mail.nih.gov and subhasis.ray@nih.gov)
2. "A new position will open soon in the Brown Bag seminar team, to help organizing bimonthly seminars, in collaboration with Randi Parks. It will include communications to the VFC list, prospection of speakers and participation to the monthly VFC meetings." (contact: randi.parks@nih.gov)



Life Outside Lab
 34th Annual
 NIH Institute
 Challenge Relay
 THURSDAY, SEPTEMBER 28
 PHOTOS BY JEREMY SWAN

2017 NIH Relay Race

The Running Gels

Congrats to The Running Gels Team from the Stratakis lab on their 2nd place finish!





Life Outside Lab

NICHD Postbac Orientation Session & Pizza Lunch

WEDNESDAY,
SEPTEMBER 27

PHOTOS BY JEREMY SWAN

November Announcements

HAVE YOU TOLD US ABOUT YOUR ACCOMPLISHMENTS THIS YEAR?

Every year, *The NICHD Connection* publishes a "Year in Review," where we share the many accomplishments of the NICHD fellows community. Did you win a poster award at a conference? Or maybe you won a grant or accepted a new job offer. We'd love to hear from you, to recognize your great news! Please send a letter to our editor, at Shana.Spindler@gmail.com, with your accomplishment(s) from 2017, and we will include them in our December issue.

A TWO-PART SERIES WITH SCOTT MORGAN ON JOB INTERVIEWING & CHALK TALKS

If you are actively looking for a job this year, we strongly recommend that you sign up for these two small-group sessions with Scott Morgan. Given how competitive the job market is, we want you to be successful in your searches.

Interviewing – Wednesday, November 29, 10 AM – 12 Noon

This workshop focuses on sample interview questions to help you formulate effective answers. Mr. Morgan aims to increase your comfort level, enhance your confidence, and most importantly, prepare you for the interview process. Together, you will analyze expected questions, themes, dilemmas, and your demeanor through interactive exercises and peer review.

Chalk Talks – Monday, December 11, 10 AM – 12 Noon

Chalk Talks are an increasingly important component of science communication. Once reserved for academic interviews, they are now common in industry and for tenure-track positions, such as the NIH Earl Stadtman Investigators program. This workshop will focus on the components that make an effective chalk talk and provide a safe place to practice new skills.

Topics include:

- » Connection to job talks
- » Relevance to faculty
- » What to draw on the white/blackboard
- » Levels of detail
- » Question anticipation
- » Tone and delivery

There are **15 spots** available for both workshops. If you would like to attend either session or both, please contact Dr. Yvette Pittman (yvette.pittman@nih.gov).

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November Announcements

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THE BUSINESS OF SCIENCE: YOUR GUIDE TO CAREER SUCCESS

A new training for fellows and graduate students interested in pursuing a career in industry

January and February of 2018—register now!

We will offer this certificate program by [SciPhD](#) as a four-day course in January and February 2018 at the NIH. Enrollment is now open for 40 NICHD trainees.

The course is designed to translate academic research skills into the business-oriented qualifications that hiring companies are looking for. At present, the course is also offered at highly respected research institutes, such as New York University, University of California San Francisco, University of California Irvine, and the New York Academy of Sciences. Ninety percent of the people who applied for jobs while taking the course reported that *The Business of Science* helped them land an interview or job offer!

Throughout the program, you will have the exciting opportunity to:

- » Learn business processes and communication skills driving science in industry
- » Learn how industry science follows the principles of the scientific method
- » Discover the many business career paths in which having a PhD can make you a competitive job candidate
- » Research a job ad and identify the scientific, business, and social skills that the company is looking for
- » Develop a targeted resume that demonstrates your specific qualifications
- » Expand your science industry network
- » Take part in mock interviews that will prepare you for your own job searches

Course instructors will hone into common research practices that academic scientists are already familiar with, to help in the understanding of business concepts, and to demonstrate how your own experiences can mold you into a competitive job candidate.

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THE BUSINESS OF SCIENCE (CONTINUED)

The Business of Science will introduce students to essential science business skills in the form of 24 core business and social competencies that are categorized into six groups as follows:

Creating the Vision

- » Strategic
- » Technical Scientific
- » Innovative
- » Risk Management
- » Champion/Energy

Developing People

- » Collaboration
- » Enabling
- » Empathy
- » Rapport

Execution

- » Structuring
- » Control
- » Tactical
- » Delegation

Achieving Results

- » Production
- » Focus
- » Competition

Communications/Learning

- » Technical Literacy
- » Style Flexibility
- » Emotional Intelligence
- » Social Intelligence

Financial Acumen

- » Return on Investment
- » Internal Rate of Return
- » Determining Performance Metrics
- » Managing the Balance Sheet

The certificate program schedule: **four, full-day sessions (9 AM – 5 PM)** as follows:

Session 1	Business of Science, and Communications	Friday, January 12
Session 2	Developing People, Negotiating with your Advisor, and Building Effective Teams	Friday, January 19
Session 3	Applied Communication & Networking, and Financial Literacy	Thursday, February 15
Session 4	Negotiating Total Compensation & Leadership Styles, and Project Management, Wrap-up & Graduation	Thursday, February 22

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November Announcements

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NICHD FELLOWS ADVISORY COMMITTEE: SEEKING NEW MEMBERS!

The Office of Education formed an advisory committee in 2016, and we are seeking several more dedicated members to help us develop and initiate academic support programs for the institute. Both domestic and visiting fellows are needed. We want to achieve a broad representation, culturally and academically, so we can address the needs of all our trainees at NICHD. The committee meets monthly to exchange ideas and informally discuss ways we can enhance and tailor the training experience within the NICHD intramural program.

Some potential topics for our committee are how to:

- » Increase participation in training activities
- » Expose fellows to various careers in science
- » Identify teaching opportunities
- » Identify internal and external research funding mechanisms
- » Establish a structure for sharing scientific and career resources within the institute

The committee meets once a month on Thursdays, from 3:00 to 4:00 PM. Our remaining dates this year are **November 9 and December 7.**

Don't miss this opportunity to serve your intramural NICHD community. Please contact Dr. Yvette Pittman at yvette.pittman@nih.gov if you are interested in joining the group.

AAAS MASS MEDIA SCIENCE & ENGINEERING SUMMER FELLOWSHIP

Applications open October 16 – January 15!

From the AAAS Mass Media Fellowship website:

This highly competitive program strengthens the connections between scientists and journalists by placing advanced undergraduate, graduate, and post-graduate level scientists, engineers and mathematicians at media organizations nationwide. Fellows have worked as reporters, editors, researchers, and production assistants at such media outlets as the *Los Angeles Times*, National Public Radio, *The Washington Post*, *WIRED*, and *Scientific American*.

For 10 weeks during the summer, the Mass Media Fellows use their academic training in the sciences as they research, write and report today's headlines, sharpening their abilities to communicate complex scientific issues to non-specialists. Participants come in knowing the importance of translating their work for the public, but they leave with the tools and the know-how to accomplish this important goal.

For additional information about the program visit aaas.org/mmfellowship

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November Announcements

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14TH ANNUAL NIH GRADUATE STUDENT RESEARCH SYMPOSIUM — OUTSTANDING MENTOR AWARD NOMINATION

From the NIH Office of Intramural Research and Education

Every year, the Symposium recognizes three outstanding mentors for his/her leadership and dedication to his/her graduate students. To nominate your mentor, please write a brief nomination letter (1-2 pages) describing why your mentor should receive the GPP Outstanding Mentor Award.

Nominations are due November 10, 2017 at 5PM!

You may wish to consider how your mentor has played a role in the following areas:

- » your ability to conduct science (critical evaluation skills, experimental design, etc.)
- » your ability to communicate scientifically (written and oral)
- » networking
- » career development
- » leadership/mentorship in the lab
- » scientific responsibility

[Nominate your mentor here!](#)

November Events

MONDAY, NOVEMBER 6, 12 – 1PM

NICHD Postbac Course: Life as a Primary Care Physician
April Walker, MD

Please contact Dr. Yvette Pittman (yvette.pittman@nih.gov) for Postbac Course information.

WEDNESDAY, NOVEMBER 8, 11 AM – 12:30 PM

“Speaking about Science: Communication for Physicians”
Led by Scott Morgan

Clinical Center, room 2-2550
For Clinical Fellows only

Scott Morgan will give an overview on tips and keys to success for public speaking. He has worked with various NIH institutes and scientists, helping people communicate their ideas in a way that makes sense for scientific and non-scientific audiences. His goal is to provide tools for good scientific talks: here at NIH as well as at meetings and/or job interviews.

*This overview session is **mandatory** for all of our clinical fellows.*

WEDNESDAY, NOVEMBER 9, 3 – 4 PM

NICHD Fellows Advisory Committee Meeting

The committee meets monthly to exchange ideas and informally discuss ways we can enhance and tailor the training experience within the NICHD intramural program. The committee meets once a month on Thursdays, from 3:00 to 4:00 p.m. Please contact Dr. Yvette Pittman at yvette.pittman@nih.gov if you are interested in joining the group.

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November Events

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MONDAY, NOVEMBER 13, 12 – 1PM

NICHD Postbac Course: Careers Outside of Academia and Medicine

Michael Dambach, PhD and Cheryl Bolinger, PhD

MONDAY, NOVEMBER 20, 12 – 1PM

NICHD Postbac Course: Reproductive Medicine and Infertility: Elevated progesterone during IVF cycles

Matthew Connell, MD

MONDAY, NOVEMBER 27, 12 – 1PM

NICHD Postbac Course: The Amazing Lysosome—A Suicide Bag and Much More

Maria Bagh, PhD

WEDNESDAY, NOVEMBER 29, 10 AM – 12 NOON

Interviewing Workshop with Scott Morgan

Learn about the interview process through interactive exercises and peer review. More workshop information is available in the [November Announcements](#). There are 15 spots for this event, please contact Dr. Yvette Pittman (yvette.pittman@nih.gov).